Patent
Attorney's Docket No. 000348-201

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Patent Application of	)	**BOX PATENT APPLICATION**
Savine BOCKEL-MACAL et al	)	Group Art Unit: Not Assigned
Application No.: Not Assigned	)	Examiner: Not Assigned
Filed: January 16, 2001	)	
For: PROCEDURE AND APPARATUS FOR THE OPTIMIZATION OF REACTIVE GAS MIXTURES	)	

PRELIMINARY AMENDMENT

Assistant Commissioner for Patents
Washington, D.C. 20231

Sir:

Prior to examination on the merits, please amend the above-identified application as follows:

IN THE ABSTRACT OF THE DISCLOSURE:

Kindly replace the original Abstract of the Disclosure with the attached Abstract.

IN THE SPECIFICATION:

Kindly amend the Specification as follows:

Page 1, line 4, please delete in its entirety and replace with:

--BACKGROUND OF THE INVENTION

1. Field of the Invention:--

Page 1, between lines 7 and 8, insert

--**2. Description of the Related Art:**--

Page 29, line 2, insert --What is Claimed is--.

IN THE CLAIMS:

Kindly cancel Claims 1-34 without prejudice or disclaimer.

Kindly add new Claims 35-68 as follows:

--35. A process for determining the risk of flammability of a mixture of at least two reactive gases A, B, in an inert or base gas, or the order of mixing of these reactive gases into the inert or base gas, the process comprising:

- a step of determining whether the composition of the mixture, during its formation, passes through the flammability region in the ternary diagram of the A/B/inert or base gas mixture when the mixture is produced according to a first mode in which A is first mixed into the inert or base gas to form a first mixture and then B is mixed into the first mixture to form the final mixture.

36. The process according to claim 35, further comprising:

- a step of determining a first transit time through the flammability region of the ternary diagram when the mixture is produced according to the first mode;

- a step of comparing the first transit time with the chemical induction time of the mixture or of the stoichiometric mixture.

37. The process according to claim 35, further comprising a step of comparing one or more mixing times of the mixer or mixers used with the chemical induction time of the mixture or of the stoichiometric mixture.

38. The process according to one of claim 35, further comprising, if the composition of the mixture passes through the flammability region of the ternary diagram, or if the first transit time or the mixing time is greater than the chemical induction time of the mixture:

- a step of determining whether the composition of the mixture, during its formation, passes through the flammability region in the ternary diagram of the A/B/inert or base gas mixture, when the latter is produced according to a second mode in which B is first mixed into the inert or base gas to form a first mixture and then A is mixed into the first mixture to form the final mixture.

39. The process according to claim 38, further comprising:

- a step of determining a second transit time through the flammability region of the ternary diagram when the mixture is produced according to the second mode;

- a step of comparing the second transit time with the chemical induction time of the mixture or of the stoichiometric mixture.

40. The process according to claim 38, further comprising a step of comparing one or more mixing times of the mixer(s) used with the chemical induction time of the mixture or of the stoichiometric mixture.

41. The process according to claim 35, wherein, if the composition of one of the mixtures according to one of the modes of injection does not pass through the flammability region during its formation, this mode is selected.

42. The process according to claim 36, wherein a mode or the mode for which the mixing time or times or the transit time through the flammability region of the ternary diagram is less than the chemical induction time of the mixture is selected.

43. The process according to claim 35, wherein, if the two modes of injection both force the composition to pass through the flammability region, selecting of the mode for which:

(i) the intermediate mixture point, representative of the composition of the first mixture, lies outside the flammability region;

(ii) the mixing time or times or the transit time through the flammability region of the ternary diagram is less than the chemical induction time of the mixture.

44. A process for producing a mixture of at least two reactive gases A, B in an inert or base gas, comprising:

- determining the flammability risk of the mixture, while the mixture is being produced, or determining the order of mixing of the reactive gases into the inert or base gas, according to claim 35;

- mixing the reactive gases A and B in the order for which the composition of the mixture does not pass through the flammability region while the composition is changing, or for which the mixing time(s) or the transit time through the flammability region of the ternary diagram is (are) less than the chemical induction time of the mixture.

45. A process for producing a final mixture of at least two reactive gases A, B in an inert or base gas, comprising:

- mixing the gas A in the inert or base gas, to form a first mixture, the composition of which changes, during its formation, outside the flammability region of the ternary diagram of the A/B/inert gas mixture, or passes through the flammability region with one or more mixing times of the mixer(s) used, or a transit time through the flammability region, less than the chemical induction time of the first mixture;

- mixing the gas B into the first mixture, forming a mixture whose composition changes towards that of the final mixture, the composition of the mixture changing, in the ternary diagram, either without passing through the

flammability region or by passing through the flammability region, with one or more mixing times of the mixer(s) used, or a transit time through the flammability region, less than the chemical induction time of the mixture.

46. The process according to claim 35, further comprising a prior step of determining the mixing time or times of one or more mixers intended to be used for mixing reactive gases and for determining the temperature at which the spontaneous ignition time of the mixture becomes equal or substantially equal to one of the mixing times.

47. The process according to claim 35, wherein the mixing is carried out at a temperature of between 300°C and 600°C.

48. The process according to claim 35, wherein the mixing of the two reactive gases A, B into an inert or base gas is that of a recycle process.

49. The process according to claim 35, wherein the mixture of the reactive gases is a mixture of oxygen and butane in an inert gas.

50. The process according to claim 35, wherein the mixture of the reactive gases is a mixture of oxygen and ethylene in an inert gas.

51. The process according to claim 35, wherein the reactive gases to be mixed into the inert or base gas are at least three in number and the order of mixing of the gases is determined by considering the pairs of gases that can be mixed successively, and the corresponding ternary diagrams.

52. The process according to claim 35, further comprising a step of consulting an electronic database containing data on ternary diagrams and/or consulting an electronic database containing data on induction times of gas mixtures and/or consulting an electronic database containing data on mixing times of mixers.

53. The process according to claim 35, further comprising a graphical representation on a display screen, of the ternary diagram(s) in question and of the corresponding flammability region(s) in this diagram(s).

54. A process for producing a plant for mixing at least two reactive gases A, B into a base gas, comprising:

- determining the order of mixing the gases according to claim 35; and
- producing a plant so as to mix the gases in the order thus determined.

55. Apparatus for establishing the flammability risk of gas mixtures, each mixture comprising at least two reactive gases A, B, in an inert or base gas, or for

determining the order of mixing of the reactive gases into the inert or base gas, comprising:

- means for storing at least one database containing, for gas mixtures, data on the ternary diagrams of the mixtures, and the flammability regions in the diagrams for given temperature and pressure conditions;
- means for selecting a gas mixture and temperature and pressure conditions to be used for the gas mixture;
- means for displaying a ternary diagram and the flammability region of a mixture in the diagram.

56. Apparatus according to claim 55, further comprising means for computing, or especially programmed means for computing or establishing, for gas mixtures each containing at least two reactive gases A, B in an inert or base gas, and for temperature and pressure conditions for the mixtures, a flammability region in the ternary diagram of the mixture.

57. The apparatus according to claim 55, further comprising means for computing, or means, especially programmed for computing or establishing, for gas mixtures each containing at least two reactive gases A, B in an inert or base gas, and for temperature and pressure conditions of these gases, a transit time for the mixture to pass through the flammability region of the corresponding ternary diagram.

58. The apparatus according to claim 55, further comprising means for storing at least one database containing, for gas mixtures, data on the induction times, or ignition times, of these mixtures according to the temperature and pressure conditions.

59. The apparatus according to claim 55, further comprising means for computing, or especially means programmed for computing or establishing, for gas mixtures each containing at least two reactive gases A, B in an inert or base gas, and according to temperature and pressure conditions of these mixtures, chemical induction times of these mixtures.

60. The apparatus according to claim 55, further comprising a database containing information on mixing times of mixers, and means for selecting a mixer.

61. The apparatus according to claim 55, further comprising means for, or means especially programmed for, comparing a mixing time or a transit time through a flammability region of one of the ternary diagrams, and a chemical induction time of this mixture.

62. Apparatus for establishing the flammability risk of mixtures, wherein each mixture includes at least two reactive gases A, B in an inert or base gas, or for establishing the order of mixing of these reactive gases into the inert or base gas,

comprising means for computing, or means especially programmed for computing, as a function of temperature and pressure conditions:

- the ternary diagram of a mixture and the flammability region in the diagram;
- a chemical induction time of the mixtures.

63. The apparatus according to claim 62, further comprising means for displaying a ternary diagram and the flammability region of a mixture in the diagram.

64. The apparatus according to claim 62, further comprising means for computing a mixing time of a given mixer or for storing mixing times of a set of mixers.

65. A terminal for establishing the flammability risk of a mixture of at least two reactive gases A, B in an inert or base gas, or the order of injecting the reactive gases into the inert or base gas, comprising:

- communication means for communicating between the terminal and means containing at least one database which includes, for gas mixtures, data on the ternary diagrams of these mixtures, and the flammability regions in the diagrams as a function of the temperature and pressure conditions;

- means for supplying the terminal with data for the user of the terminal, including at least one gas mixture used, and the temperature and pressure conditions of use;

- storage means, communicating with the means for supplying the terminal with the user data, to store the user data, as well as data supplied by the database on the ternary diagram of the mixture selected;

- display means, communicating with the storage means, for presenting in the form of a graph, at least the ternary diagram supplied by the database.

66. A computer program comprising the instructions for executing a process according to claim 35.

67. A data medium, which can be read by a computing system, comprising the data, in coded form, for executing a process according to claim 35.

68. A software product comprising a program data medium means, capable of being read by a computing system, allowing a process according to claim 35 to be executed.--

REMARKS

Entry of the foregoing amendments is respectfully requested. The Abstract of the Disclosure has been replaced with a new Abstract. In addition, the specification

has been amended to incorporate the section headings suggested by the U.S. Patent and Trademark Office. Claims 1-34 have been canceled and replaced with new Claims 35-68. The new claims generally correspond to the original claims, and have been revised to remove multiple dependencies and to otherwise place them in better form for examination in accordance with U.S. patent practice.

Favorable consideration of the subject application is respectfully requested.

If there are any questions concerning this paper, or the application in general, the Examiner is invited to telephone the undersigned at his or her earliest convenience.

Respectfully submitted,

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ABSTRACT OF THE DISCLOSURE

The invention relates to a process for determining the risk of flammability of a mixture of two reactive gases A, B, in an inert or base gas, which includes: a step of determining, in the flammability diagram for the A/B/base gas mixture, the change in the composition of the mixture to determine whether or not the composition has passed through the flammability region of the flammability diagram, when A is first injected into the inert or base gas to form a first mixture and then B is injected into the first mixture to form the final mixture; a step of comparing the mixing time, should the region have been passed through, with the chemical induction time for the mixture.